CLINICAL AND LABORATORY CHARACTERISTICS OF 644 STUDY

SUBJECTS BY DEGREE OF CAD

CAD RISK FACTORS [a]	Maximum stenosis			P-value
	0 - 9% (n = 430)	10 - 49% (n = 98)	50 - 100% (n = 116)	
Age, years	39.9 (6.3)	45.3 (5.9)	45.3 (5.4)	.000
Cigarettes/day	5.68 (10.91)	7.84 (13.57)	10.59 (13.87)	.000
Systolic blood pressure, mm Hg	125.7 (13.2)	126.8 (13.0)	131.0 (13.3)	.001
Total bilirubin, μmol/L	14.8 (7.1)	13.1 (4.7)	12.5 (5.8)	.001
Total cholesterol, mmol/L	5.32 (0.99)	5.91 (0.93)	6.16 (1.15)	.000
HDL-cholesterol, mmol/L	1.21 (0.31)	1.14 (0.26)	1.11 (0.24)	.002
Triglycerides [b], mmol/L	1.56 (1.11)	1.76 (0.92)	1.87 (0.88)	.009
Cholesterol/HDL-C [c]	4.71 (1.62)	5.42 (1.47)	5.81 (1.59)	.000
(Cholesterol/bilirubin) (÷ 100) [d]	4.26 (1.91)	5.11 (1.95)	5.85 (2.56)	.000
Cholesterol/(HDL-C + bilirubin) [c]	1.69 (0.59)	2.01 (0.57)	2.21 (0.66)	.000
LDL-C/HDL-C [c]	3.01 (1.11)	3.64 (1.16)	3.97 (1.33)	.000
LDL-C/(HDL-C + bilirubin) [c]	1.08 (0.42)	1.35 (0.43)	1.51 (0.53)	.000

[a] Values are given as mean ± SD. To convert values for cholesterol, triglycerides, and bilirubin to mg/dL, multiply by 38.66, 88.54, and 0.05847. Analysis of variance. All F-values were significant at P = 0.009.

[b] Triglyceride concentrations are expressed as mmol/L triolein.

[c] Cholesterol/HDL-C, LDL-C/HDL-C, cholesterol/(HDL-C + bilirubin), and LDL-C/(HDL-C + bilirubin) ratios are presented on a mg/dL basis. Bilirubin concentrations were multiplied by 100 before combining with HDL-C. For example, the cholesterol/(HDL-C + bilirubin) ratio was calculated by taking each individual's cholesterol concentration in mg/dL and dividing it by the sum of the HDL-cholesterol concentration in mg/dL plus the bilirubin concentration in mg/dL x 100.

[d] Cholesterol/bilirubin ratios were calculated as the ratio of cholesterol, mmol/L, divided by bilirubin, mmol/L, divided by 100.

FIG. 1

RESULTS OF DISCRIMINANT ANALYSIS USING TRADITIONAL

RISK FACTORS AND VARIOUS LIPID-LIPOPROTEIN AND LIPID-

LIPOPROTEIN-BILIRUBIN COMBINATIONS

Discriminant analysis showing variables tested for inclusion into model.

Variables accepted in model	Wilks' Lambda
Age	0.848
LDL-C/(HDL-C + bilirubin)	0.839
Systolic blood pressure	0.769
Variables not included in model	
Cholesterol/(HDL-C + bilirubin)	0.757
HDL-cholesterol	0.757
Triglycerides	0.757
Cholesterol/HDL-C	0.755
Cholesterol/bilirubin	0.755
LDL-C/HDL-C	0.753
Total bilirubin	0.751
Cigarettes per day	0.749
Total cholesterol	0.749

Coronary artery disease classification results.

Actual group	No. cases	Predicted Group Membership 0 - 9%	10 - 49%	50 - 100%
0 - 9%	457	430 94.1%	3 0.7%	24 5.3%
10 - 49%	98	74 75.5%	6 6.1%	18 18.4%
50 - 100%	116	74 63.8%	1 0.9%	41 35.3%

FIG. 2

PERCENT CORRECT CLASSIFICATION FOR EACH RISK FACTOR

COMBINATION FOR PREDICTING CORONARY ARTERY DISEASE

Coronary Artery Disease Classification [a]

Risk Factor Variable	0 - 9% Specificity %	10 - 49%	50 - 100% Sensitivity %	Overall Correct %
Age	97.2	0	13.8	67.4
Age, cholesterol	95.1	4.1	23.3	68.3
Cholesterol/HDL-C	97.0	0	6.8	67.2
LDL-C/HDL-C	97.5	0	6.9	67.6
Cholesterol/bilirubin	96.8	0	14.4	68.3
Cholesterol/(HDL-C + bilirubin)	96.1	0	17.1	68.3
LDL-C/(HDL-C + bilirubin)	96.0	0	17.9	68.4
Laboratory risk factors [b]	95.1	0	19.2	68.0
Traditional risk factors [c]	92.8	8.2	28.4	68.3
Traditional and cholesterol/(HDL-C + bilirubin) [d]	92.1	8.2	35.3	69.1
Traditional and LDL-C/(HDL-C + bilirubin) [e]	94.1	6.1	35.3	71.1

[a] 95% Confidence intervals for sensitivity, specificity, and overall correct are
approximately ± 8%, ± 2%, and ± 3%, respectively.
[b] Laboratory risk factors that entered the discriminant model were LDL/(HDL + bilirubin)
and cholesterol.
[c] Traditional risk factors examined included cholesterol, cigarettes/day, systolic blood
pressure, triglycerides, cholesterol/HDL-C, and HDL-cholesterol. Age, cholesterol,
systolic blood pressure, and cigarettes/day entered the discriminant model.
[d] Age, cholesterol/(HDL-C + bilirubin), cholesterol, systolic blood pressure, and
cigarettes/day entered the discriminant model.
[e] Age, LDL/(HDL-C + bilirubin), and systolic blood pressure entered the model.

FIG. 3

DIAGNOSTIC PERFORMANCE OF VARIOUS RISK FACTORS FOR

PREDICTING SEVERE CORONARY ARTERY DISEASE USING 75TH

PERCENTILE AS A CUT-POINT

Risk Factor Variable [a,c]	Sensitivity (%)	Specificity (%)	Efficiency of Test (%) [b]
Cholesterol/HDL-C	(59/146) 40.4	(573/731) 78.4	(632/877) 72.1
LDL-C/HDL-C	(63/145) 43.4	(577/731) 78.9	(640/877) 73.0
Cholesterol/bilirubin	(71/146) 48.6	(584/730) 79.9	(655/877) 74.7
Cholesterol/(HDL-C + bilirubin)	(76/146) 52.1	(588/731) 80.4	(664/877) 75.7
LDL-C/(HDL-C + bilirubin)	(75/145) 51.7	(587/731) 80.3	(662/877) 75.5

[a] Numbers in parentheses represent the actual subject counts. Cut-points (75th percentile) for the cholesterol/HDL-C ratio, LDL-C/HDL-C ratio, cholesterol/bilirubin ratio, cholesterol/(HDL-C + bilirubin) ratio, and LDL-C/(HDL-C + bilirubin) ratio were 6.04, 4.12, 3.84, 2.25, and 1.5, respectively.

[b] Efficiency of test was calculated as follows: TP + TN/ (TP + TN + FP + FN)

[c] 95% Confidence intervals for sensitivity, specificity, and efficiency of a test are approximately ± 8%, ± 4%, and ± 3%, respectively.
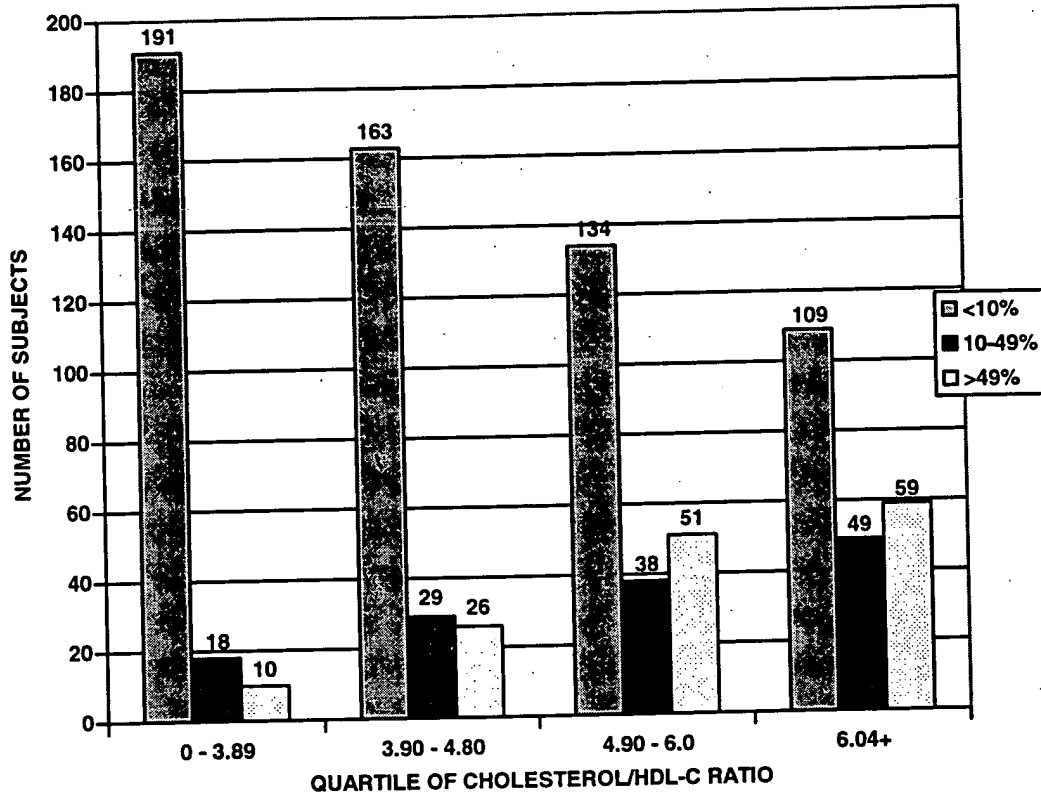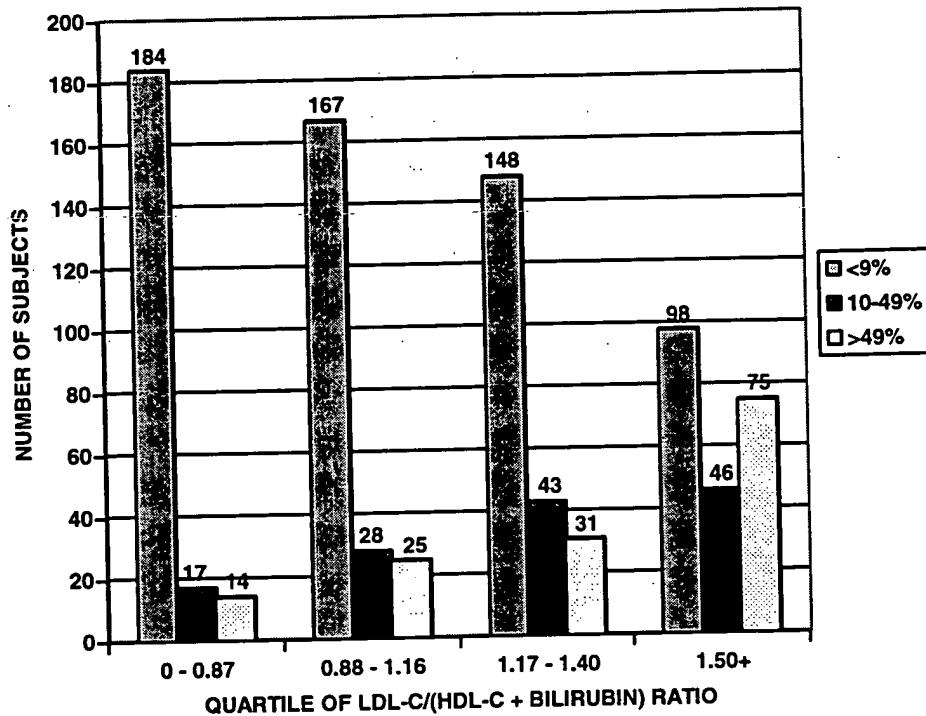
$$\mathcal{FIG.} \; 4$$

FIG. 5

FIG. 6